

REMARKS/ARGUMENTS

With this amendment, claims 1, 3-14, 25-35, and 70-71 are pending. Claims 2, 15-24 and 36-69 are cancelled without prejudice. For convenience, the Examiner's rejections are addressed in the order presented in a June 11, 2008, Office Action.

I. Status of the claims

Claims 1 and 25 are amended to recite that colorectal mucosal tissue is the only site of initial contact between the immunogenic peptide and the subject. Support for this amendment is found throughout the specification, for example, at page 33, lines 33-35; page 34, lines 13-15 and lines 29-33; page 35, lines 20-23; page 36, lines 1-9 and lines 33-35; page 37, lines 11-14 and lines 23-25; page 38, lines 3-9; page 39, lines 21-27. Claims 6 and 27 are amended to recite that the purified cytokine is contacted to a colorectal mucosal surface. Support for this amendment is found throughout the specification, for example, at page 36, lines 1-9. As indicated in a declaration from Dr. Jay Berzofsky, colorectal is a standard term in the field, used to refer to the colon and rectum. Support for colorectal administration is found throughout the specification, for example, at page 5, line 37 through page 6, line 1 and at page 21, lines 17-21. These amendments add no new matter.

New claim 70 depends from claims 1 and 25 and recites administration of an interleukin-12 (IL-12) protein to the subject. New claim 70 depends from claim 71 and recites contacting the IL-12 protein with a colorectal mucosal surface. Support for this amendment is found throughout the specification, for example, at page 36, lines 1-9 and at Example 11, page 45 and Figure 15.. These amendments add no new matter.

II. Rejections under 35 U.S.C. §103(a)

The claims 53, 55, 58-61, and 63 are rejected as allegedly obvious over various combinations of references. To the extent the rejection applies to the amended claims, Applicants respectfully traverse the rejection.

To establish a *prima facie* case of obviousness, three basic criteria must be met: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference must teach or suggest all the claims limitations. MPEP§2143. Recently, in reviewing this standard, the Supreme Court noted that any analysis supporting a rejection under § 103(a) must be made explicit, and that it is "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements in the manner claimed." *KSR Intl Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (U.S. 2007). "This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *Id.*

While the Court warned against a "rigid application" of the TSM test, the Court also found that these questions could provide a "helpful insight" in determining whether the claimed subject matter is obvious under § 103(a). *Id.* at 1396-1397. *See also*, Memorandum to Technology Directors from Margaret A. Focarino, Deputy Commissioner for Patent Operations, May 3, 2007.

A. *Klavinskis et al., and Ahlers et al. or Berzofsky et al.*

Claims 1, 3, 4, and 25 are rejected as allegedly obvious over *Klavinskis et al. J. Immunol.* 157:2521-2527 (1996) and either *Ahlers et al. J. Immunol.* 158:3947-3958 (1997) or *Berzofsky et al. WO 94/26785*. According to the Office Action, *Klavinskis et al.*, discloses rectal and vaginal immunization using an SIV antigen linked to a cholera toxin. This immunization allegedly resulted in production of antigen-specific cytotoxic T lymphocytes (CTLs). *Ahlers et al.* and *Berzofsky et al.* allegedly disclose the recited antigenic sequence, SEQ ID NO:9. According to the Office Action, one of skill would have been motivated to practice the claimed invention by a suggestion of *Klavinskis et al.* that to prevent dissemination of HIV to the

regional lymph nodes, an effective vaccine may need to stimulate CTLs in the rectal or genital tract. Office Action at page 3.

Applicants respectfully disagree. The claimed method is immunization of a subject by administering SEQ ID NO:9 using only colorectal tissue as the site of administration of the vaccine. In contrast, Klavinskis *et al.* disclose only a combination immunization schedule. That is, Klavinskis *et al.* teach administration at a rectal or vaginal site, followed by three oral administrations of the vaccine. Klavinskis *et al.* provide no suggestion or motivation to reduce or eliminate the oral administration for the vaccine.

Applicants submit as Exhibit A, a declaration from inventor, Dr. Jay Berzofsky. Dr. Berzofsky first states that the claimed peptide (SEQ ID NO:9) and the peptide exemplified in the specification (Seq ID NO:2) share the identical immunogenic helper peptide sequence and slightly different variations of the same immunogenic CTL epitope sequence. Thus, Dr. Berzofsky believes that similar immune responses would be generated by both peptides.

Dr. Berzofsky states that on reading Klavinskis *et al.*, in his opinion, a skilled artisan would understand that the three additional oral administrations of antigen were required to raise an immune response against the antigen. Thus, Klavinskis *et al.* teach away from the claimed invention, which requires administration of antigen only to a colorectal site. The other cited references, Ahlers *et al.* and Berzofsky *et al.*, do not disclose colorectal administration of an HIV antigen. Therefore, the claimed invention is not obvious in view of the cited references.

B. *Klavinskis et al., and Ahlers et al. or Berzofsky et al., in further view of Kiyono et al.*

Claims 1, 5-14, and 25-35 are rejected as allegedly obvious over Klavinskis *et al.* and either Ahlers *et al.* or Berzofsky *et al.*, in further view of Kiyono *et al.* Advanced Drug Delivery Reviews 18:23-51 (1995). According to the Office Action, Ahlers *et al.* teach administration of a cytokine with a peptide of SEQ ID NO:9 and Kiyono *et al.* provide motivation to do so by allegedly suggesting that Th cell-derived cytokines are essential for the induction of appropriate antigen-specific mucosal immune responses. Office Action at page 5.

Ahlers *et al.* and Kiyono *et al.* disclose only subcutaneous administration of cytokine with antigen. *See, e.g.,* Ahlers *et al.* at page 3948, top right column and Kiyono *et al.*, pages 41-42. Claims 6, 27, and 71, recite administration of a cytokine to a colorectal mucosal surface. The specification demonstrates that colorectal administration of IL-12 with SEQ ID NO:2 provides a significant increase in CTL level in both mucosal and systemic sites as compared to colorectal administration of SEQ ID NO:2 without IL-12. *See, e.g.,* specification at page 36, lines 1-9. In addition, intraperitoneal (IP) treatment with IL-12 combined with the colorectal immunization of SEQ ID NO:2 did not increase CTL levels. *See, e.g.,* specification at Example 11, page 45 and Figure 15. As above, according to Dr. Berzofsky, similar immune response are raised by SEQ ID NO:2 and the claimed SEQ ID NO:9.

In his declaration, Dr. Berzofsky states that the activity of cytokine after administration to a colorectal mucosal surface was surprising. Unlike subcutaneous administration, colorectal administration requires the cytokine to retain activity after passing through the hostile environment of the colon. To maintain activity, a cytokine protein must maintain a specific, active structure to allow binding to a cytokine receptor on an appropriate cell. An active cytokine protein requires some minimum of the amino acid sequence to be present in a tertiary structure that is recognized by an appropriate cytokine receptor. According to Dr. Berzofsky, the colon is colonized by bacteria and contains bacterial proteases that can degrade the amino acid sequence of proteins, including cytokines. Thus, according to Dr. Berzofsky, one of skill would not expect the administered cytokine to be active after administration to the colon. In addition, Dr. Berzofsky states that, in order to reach cells that express a cytokine receptor, the cytokine had to pass from the colorectal space and through a protective layer of mucus. The passage of the cytokine through the mucus layer and maintenance of activity would not have been expected by those of skill in Dr. Berzofsky's opinion. Therefore, at a minimum, claims 6, 27, and 71, which recite administration of a cytokine to a colorectal mucosal surface in combination with colorectal administration of SEQ ID NO:9, are not obvious in view of the cited references.

Appl. No. 10/815,340
Amdt. dated September 9, 2008
Amendment under 37 CFR 1.116 Expedited Procedure
Examining Group 1645

PATENT

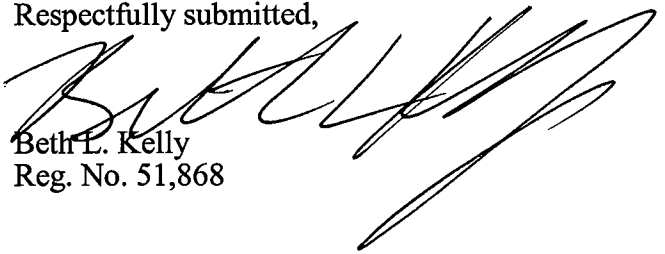
In view of the above amendments and remarks, withdrawal of the rejection for alleged obviousness is respectfully requested.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 206-467-9600.

Respectfully submitted,


Beth L. Kelly
Reg. No. 51,868

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Attachments
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EXHIBIT A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Jay A. Berzofsky et al.

Application No.: 10/815,340

Filed: March 30, 2004

For: MUCOSAL CYTOTOXIC T
LYMPHOCYTE RESPONSES

Customer No.: 45115

Confirmation No. 8261

Examiner: Nicole Kinsey

Technology Center/Art Unit: 1645

DECLARATION OF DR. JAY A.
BERZOFSKY UNDER 37 C.F.R. §1.132Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1. All statements herein made of my own knowledge are true, and statements made on information or belief are believed to be true and correct.

2. Since 2004 I have been Chief of the Vaccine Branch at the Center for Cancer Research, of the National Cancer Institute, at National Institutes of Health (NIH). My tenure at NIH began in 1974 with a research associate position in the Laboratory of Chemical Biology, at the National Institute of Arthritis, Metabolism, and Digestive Diseases. I have held positions as Investigator and Senior Investigator at the Metabolism Branch of the National Cancer Institute. Before I began my current position, I was Chief of the Molecular Immunogenetics and Vaccine Research Section, Metabolism Branch, at the National Cancer Institute.

3. I received my undergraduate degree, summa cum laude, from Harvard University. I received a Ph.D. in molecular biology and an M.D. degree from Albert Einstein

College of Medicine. I did a medical internship at Massachusetts General Hospital in Boston, MA.

4. I have received a number of scientific awards and prizes, including the NIH Director's Award and NIH/NCI Merit Award. I was elected President of the American Society for Clinical Investigation for 1993-1994. I have been a Fellow of American Association for the Advancement of Science since 1994 and am currently chair of the Medical Sciences Section of the AAAS. I was also chosen the Distinguished Alumnus of the Year for 2007 by the Albert Einstein College of Medicine. I have held editorial positions on nine scientific journals, including *Journal of Immunology*, *Journal of Molecular and Cellular Immunology*, *Molecular Immunology*, *Peptide Research*, *International Immunology*, *Journal of Human Virology*, *Journal of Clinical Investigation*, *Clinical Immunology*, and *Clinical Cancer Research*. I am an author or co-author of more than 430 scientific articles, reviews, and book chapters. A copy of my curriculum vitae is attached hereto as Exhibit B and includes a list of selected publications

5. The present invention is a method for inducing an antigen-specific systemic and colorectal mucosal cytotoxic T lymphocyte (CTL) response in a mammal by colorectal administration of a chimeric peptide having the amino acid sequence **KQIINMWQEVGKAMYAPPISGQIRRIHIGPGRAFYTTKN** (SEQ ID NO:9). The immunization can be done with an adjuvant or without an adjuvant. Claims are also directed to colorectal co-administration with a cytokine. Colorectal is a standard term, as in colorectal cancer, which is widely used in the field, connoting the whole large intestine that includes both the colon and the rectum.

6. The Examples in the specification use SEQ ID NO:2, the amino acid sequence **KQIINMWQEVGKAMYAPPISGQIRRIQRGPGRFVTIGK**. SEQ ID NO:2 and SEQ ID NO:9 share the cluster peptide sequence **KQIINMWQEVGKAMYAPPISGQIR** (SEQ ID NO:18) and differ in CTL epitopes. Because of the identity of the cluster peptide sequence, which serves to provide helper epitopes, and because the remainder of the sequence represents the same CTL epitope from two different strains of HIV (Seq ID No 2 from the IIIB strain and seq ID no 9 from the MN strain, both of which are immunogenic), I believe that the immune

response against SEQ ID NO:9 would be similar to the immune response against SEQ ID NO:2, as disclosed in the specification.

7. I have read and am familiar with the contents of this patent application and I am a named inventor of the claimed invention. In addition, I have read an Office Action, dated June 11, 2008, received in the present case. It is my understanding that the Examiner alleges that various claims are obvious in view of Klavinskis *et al.*, *J. Immunol.* 157:2521-2527 (1996) and either Ahlers *et al.*, *J. Immunol.* 158:3947-3958 (1997) or Berzofsky *et al.*, WO 94/26785; or in view of Klavinskis *et al.* and either Ahlers *et al.* or Berzofsky *et al.* in further view of Kiyono *et al.* *Advanced Drug Delivery Reviews*, 18:23-52 (1995). Specifically, the Examiner alleges that Klavinskis *et al.* discloses administration of an SIV peptide antigen covalently linked to an adjuvant, cholera toxin B subunit (CTB), and subsequent isolation of antigen-specific cytotoxic lymphocytes from rectal mucosa. The Examiner also alleges that because the rectal route is a recognized route for HIV transmission, Klavinskis *et al.* would have motivated those of skill to use rectal administration of the peptides taught in Ahlers *et al.* and Berzofsky *et al.* to raise an immune response against the HIV virus. The Examiner alleges that Kiyono *et al.* would motivate those of skill to administer the peptides of Ahlers *et al.* and Berzofsky *et al.* rectally in combination with a cytokine.

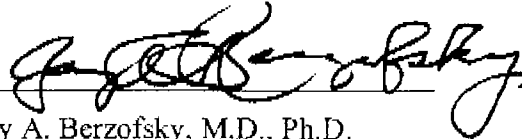
8. This declaration is provided to demonstrate that Klavinskis *et al.* teaches away from the exclusive colorectal administration of an HIV immunogen as is demonstrated in the specification. In addition, this declaration is provided to demonstrate that colorectal administration of cytokines with the HIV immunogen was unexpectedly effective in enhancing the immune response.

9. Klavinskis *et al.* used rectal administration of an HIV immunogen only in combination with three oral administrations of the same immunogen. In my opinion, one of skill, on reading Klavinskis *et al.*, would recognize a requirement for additional oral administration after the rectal administration, in order to generate an immune response against an HIV immunogen. Immunization protocols are designed to provide maximal immune response to an antigen. Klavinskis *et al.* provide no reason to eliminate the three oral immunizations after the

rectal immunization with an HIV antigen. Therefore, Klaviskis *et al.* teach away from using only colorectal administration of the immunogen, as is claimed. In contrast, the specification shows that colorectal administration alone is sufficient to generate a robust cellular immune response systemically and at the site of administration.

10. Ahlers *et al.* and Kiyono *et al.* disclose only subcutaneous administration of cytokine with antigen. I did not expect an enhanced immune response against the HIV immunogen after colorectal administration of a cytokine, a protein. Colorectal administration requires the cytokine to retain activity in the hostile environment of the colon. The colon is populated by bacteria that routinely secrete (or release on their deaths) protein degradative enzymes into their extracellular environment. The appearance of cytokine activity in the form of an enhanced immune response after colorectal administration of the cytokine with SEQ ID NO:2 was a surprising result because of the likelihood of protein degradation caused by bacterial enzymes. In addition, to reach the appropriate receptor on an immune cell, the colorectally administered cytokine had to pass from the interior of the colon through a protective mucus layer. I did not know that the co-administration of cytokine would enhance the immune response to the HIV immunogen until the experiment was done and the results were available. In my opinion, one of skill would have been surprised that an active cytokine could reach its site of action after being administered to the colon.

11. In view of the forgoing, in my opinion, the cited references do not teach, suggest, or predict the claimed methods. In addition, the robust immune response generated after only colorectal administration of SEQ ID NO:9 was a surprising result, as was the enhancement of that immune response by colorectal administration of a cytokine.

Date: September 9, 2008 By: 
Jay A. Berzofsky, M.D., Ph.D.

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EXHIBIT B

CURRICULUM VITAE

Name: Jay Arthur Berzofsky

Education:

1967 - A.B., Harvard University (Summa Cum Laude in Chemistry)
 1971 - Ph.D., Albert Einstein College of Medicine, Molecular Biology
 1973 - M.D., Albert Einstein College of Medicine, Medical Scientist
 Training Program

Brief Chronology of Employment:

1973 - 1974	Medical Internship (Straight Medicine), Massachusetts General Hospital, Boston, Massachusetts
1974 - 1976	Research Associateship, Laboratory of Chemical Biology National Institute of Arthritis, Metabolism, and Digestive Diseases, National Institutes of Health
1976 - 1979	Investigator ("Expert"), Metabolism Branch, National Cancer Institute, National Institutes of Health
1979 - 1987	Senior Investigator, Metabolism Branch, National Cancer Institute, National Institutes of Health
1987 - 2003	Chief, Molecular Immunogenetics and Vaccine Research Section, Metabolism Branch, National Cancer Institute, National Institutes of Health
2004 – Date	Chief, Vaccine Branch, Center for Cancer Research, National Cancer Institute, National Institutes of Health

Honors/Awards:

Detur Prize, Harvard University, 1964
 Harvard College Scholarship, Harvard University, 1964
 Phi Beta Kappa, Junior Year, Harvard University, 1966
 Summa Cum Laude in Chemistry, Harvard University, 1967
 Sophia Freund Prize for Graduate with Highest Cumulative Grade Point Average, Harvard College, 1967
 NIH Special Achievement Award, 1982
 Hollister - Stier's Distinguished Lectureship, Washington State University, 1986
 J. W. McLaughlin Fund Distinguished Contributions to Immunology Lectureship, University of Texas Medical School, Galveston, 1987
 U. S. Public Health Service Superior Service Award, 1988
 31st Michael Heidelberger Award and Lecture, Columbia University, 1992

McLaughlin Visiting Professorship, University of Texas Medical School,
Galveston, 1992
American Society for Clinical Investigation, President 1993-94
Fellow of the American Association for the Advancement of Science, 1995
Cytokine Interest Group Best Paper of 2000 Award to fellow in lab, 2001
The 2004 Tadeusz J. Wiktor Memorial Lecture, Wistar Institute, University of
Pennsylvania, Philadelphia, PA., November 17, 2004
Chair, Medical Sciences Section, American Association for the Advancement of Science,
2007-2008
The Herschel Zackheim Lectureship Award, International Society for Cutaneous
Lymphomas, 2007
Distinguished Alumnus of the Year Award 2007, Albert Einstein College of Medicine
NIH Director's Award, 2008
NIH/NCI Merit Award, 2008

Professional Society Memberships:

Association of Harvard Chemists, 1967 - present
New York Academy of Sciences, 1971 - present
American Association of Immunologists, 1977 - present
Undersea Medical Society, 1978 - 1988
American Federation for Clinical Research, 1979 - present
American Society of Biological Chemists, 1980 - present
American Society for Clinical Investigation, 1983 - present,
Secretary-Treasurer, 1989 - 1992
President-elect, 1992-1993
President, 1993-94
Association of American Physicians, 1990 – present
American Association for the Advancement of Science, Fellow; Chair of Medical
Sciences Section, 2007-2008
American Association for Cancer Research, 2006 - present
Faculty of 1000, 2006-present

Editorial Positions:

Associate Editor, *Journal of Immunology*, 1980 - 1984
Editorial Advisory Board, *Journal of Molecular and Cellular Immunology*, 1983-88
Advisory Editor, *Molecular Immunology*, 1985 - 1988
Editorial Board, *Peptide Research*, 1987 - present
Transmitting Editor, *International Immunology*, 1988 - 2000
Editorial Board, *Journal of Human Virology*, 1997-present
Consulting Editor, *Journal of Clinical Investigation*, 1998-2005
Section Editor, *Clinical Immunology*, 2002-2007
Associate Editor, *Clinical Cancer Research*, 2002-present

Professional Committees and Activities:

American Association of Immunologists, Membership Committee, 1981 - 1988

American Association of Immunologists, Chairman of Membership Committee,
1983 - 1988
 NIH Clinical Center Compensable Events Committee, 1982 - present
 American Society for Clinical Investigation, Council, 1989-1994
 NCI Division of Clinical Sciences Promotion and Tenure Committee, 1995-2001.
 NCI Division of Clinical Sciences Research Advisory Group, 1995-2001
 NCI Director's Intramural Advisory Board, 1997-99
 NIH AIDS Vaccine Research Center Steering Committee, 1997-present
 NIH Search Committee for Director of Office of AIDS Research, 1997-98
 NIAID Malaria Vaccine Task Force, 1998-present
 NCI Vaccine Working Group, Chairman/Organizer, 1998-present
 NCI/CCR Immunology Faculty Steering Committee, 2001-present
 NCI/CCR HIV & Virology Faculty Steering Committee, 2001-present
 NCI/CCR Frontiers in Science Newsletter Editorial Board, 2001-present.
 NCI/NIH Committee for Biodefense, founding member, 2001-present.
 NCI Center of Excellence in Immunology, Steering Committee, 2003-present.
 NIH CRADA 01361 with Genzyme Corporation. Co-principal Investigator, 2003-present
 Advisory Committee, Harvard Blood Center, 2004-present
 External Advisory Committee, University of London, 2006-present.
 NIH Director's Biennial Report to Congress, 2007, Team Leader for Cancer topic.
 NCI Cancer & Inflammation Program Tenure Track Search Committee, Chair, 2007-
2008.
 NIAID Laboratory of Malaria Immunology & Vaccines Lab Chief Search Committee,
2008.

Military Service:

Commissioned Corps, United States Public Health Service, 1974 - 1976

Other Research Experience:

Summers, 1962 - 1965 Research Assistant, Pediatric Research Unit (H. M.
Nitowsky), Sinai Hospital, Baltimore, Maryland
 Summer, 1966 Research Assistant, Organic Synthesis Laboratory
 C. H. Robinson), Department of Pharmacology, Johns
 Hopkins School of Medicine, Baltimore, Maryland
 Summer, 1967 Visiting Scientist, Laboratoire d'Enzymologie (G. N.
 Cohen), Centre National de la Recherche Scientifique, Gif-sur-Yvette, France

Medical Licensure: Maryland and Massachusetts

Major Outside Activities (Not permitted by NIH after 2005)

Medimmune, Inc.—Scientific Founder and Chair, Scientific Advisory Board, 1989-2002
 Magainin Pharmaceuticals, Inc.—Member, Scientific Advisory Board, 1991-97
 Diacrin, Inc.—Member, Scientific Advisory Board, 1993-2002
 Pharmadyne, Inc.—Scientific Co-Founder and Chair, Scientific Advisory Board, 1997-
2004
 Boston University Community Technology Fund—Consultant, 1997-1999

Health Care Ventures, Inc.—consultant, 1998
 EMD Pharmaceuticals, Inc.—consultant, 2000-2003
 Epivax, Inc.—Member, Scientific Advisory Board, 2000-2004
 Therapeutic Devices, Inc.—consultant, 2002-2004
 Transform Pharmaceuticals, Inc.—consultant 2002-2005
 Celera Genomics, Inc.—consultant 2002-2004
 Genencor International, Inc.—consultant 2003-2004.

Major areas of research:

1. Molecular basis of antigen recognition by T lymphocytes
2. Processing of antigens and their presentation by major histocompatibility molecules
3. Structure of antigenic sites on protein antigens
4. Genetic regulation of the immune response
5. Design and development of artificial vaccines based on immunological principles and peptide synthesis or recombinant DNA technology
6. AIDS vaccines and diagnostic techniques
7. Malaria vaccines
8. Cancer vaccines
9. Antigen-antibody interactions
10. Structure-function relationships in proteins and protein conformation.
11. Regulation of tumor immunosurveillance and T cell function by cytokines and regulatory cells
12. NKT cells in the regulation of tumor immunity
13. Mucosal immunity and vaccines

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Jay Arthur Berzofsky

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2. Berzofsky, J.A., J. Peisach, and W.E. Blumberg. 1971. Sulfheme proteins. I. Optical and magnetic properties of sulfmyoglobin and its derivatives. *J. Biol. Chem.* 246:3367-3377.
3. Peisach, J., J.A. Berzofsky, and W.E. Blumberg. 1973. Electronic control of oxygen binding to heme proteins. In *Proceedings of the Second International Symposium on Oxidases and Related Oxidation-Reduction Systems*. T.E. King, H.S. Mason, and M. Morrison, editors. University Park Press, Baltimore. 265-278.
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5. Berzofsky, J.A., J. Peisach, and W.E. Blumberg. 1971. Sulfheme proteins II. The reversible oxygenation of ferrous sulfmyoglobin. *J. Biol. Chem.* 246:7366-7372.
6. Berzofsky, J.A., J. Peisach, and J.O. Alben. 1972. Sulfheme proteins. III. Carboxysulfmyoglobin: The relation between electron withdrawal from iron and ligand binding. *J. Biol. Chem.* 247:3774-3782.
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8. Berzofsky, J.A., A.N. Schechter, and H. Kon. 1976. Does Freund's adjuvant denature protein antigens? EPR studies of emulsified hemoglobin. *J. Immunol.* 116:270-273.
9. Berzofsky, J.A., J.G. Curd, and A.N. Schechter. 1976. Probability analysis of the interaction of antibodies with multideterminant antigens in radioimmunoassay: application to the amino terminus of the beta chain of hemoglobin S. *Biochem* 15:2113-2121.
10. Berzofsky, J.A., A.N. Schechter, G.M. Shearer, and D.H. Sachs. 1977. Genetic control of the immune response to staphylococcal nuclease III. Time course and correlation between the response to native nuclease and the response to its polypeptide fragments. *J. Exp. Med.* 145:111-112.
11. Berzofsky, J.A., A.N. Schechter, G.M. Shearer, and D.H. Sachs. 1977. Genetic control of the immune response to staphylococcal nuclease IV. H-2-linked control of the relative proportions of antibodies produced to different determinants of native nuclease. *J. Exp. Med.* 145:123-145.
12. Sachs, D.H., J.A. Berzofsky, C.G. Fathman, D.S. Pisetsky, A.N. Schechter, and R.H. Schwartz. 1976. The immune response to staphylococcal nuclease: A probe of cellular and humoral antigen specific receptors. *Cold Spring Harbor Symp. Quant. Biol.* 41:295-306.
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Jay Arthur Berzofsky

1. Nitowsky, H.M., L. Matz, and J.A. Berzofsky. 1966. Studies on oxidative drug metabolism in the full-term newborn infant. *J. Pediatrics* 69:1139-1149.
2. Berzofsky, J.A., J. Peisach, and W.E. Blumberg. 1971. Sulfheme proteins. I. Optical and magnetic properties of sulfmyoglobin and its derivatives. *J. Biol. Chem.* 246:3367-3377.
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4. Berzofsky, J.A. 1971. The nature of sulfmyoglobin: Chemical, physical, and oxygen-binding properties. Albert Einstein College of Medicine, New York.
5. Berzofsky, J.A., J. Peisach, and W.E. Blumberg. 1971. Sulfheme proteins II. The reversible oxygenation of ferrous sulfmyoglobin. *J. Biol. Chem.* 246:7366-7372.
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7. Berzofsky, J.A., J. Peisach, and B.L. Horecker. 1972. Sulfheme proteins. IV. The stoichiometry of sulfur incorporation and the isolation of sulfhemin, the prosthetic group of sulfmyoglobin. *J. Biol. Chem.* 247:3783-3791.
8. Berzofsky, J.A., A.N. Schechter, and H. Kon. 1976. Does Freund's adjuvant denature protein antigens? EPR studies of emulsified hemoglobin. *J. Immunol.* 116:270-273.
9. Berzofsky, J.A., J.G. Curd, and A.N. Schechter. 1976. Probability analysis of the interaction of antibodies with multideterminant antigens in radioimmunoassay: application to the amino terminus of the beta chain of hemoglobin S. *Biochem* 15:2113-2121.
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- Khleif, S.N. and J. A. Berzofsky. Methods and Composition for Co-stimulation of Immunological Responses to Peptide Antigens. Provisional Application 60/189,396 filed March 15, 2000. US Patent Application No. 09/810,310, filed March 14, 2001. European Patent EP1877087.
- Khleif, S.N and J. A. Berzofsky. Human Papillomavirus Immunoreactive Peptides. Provisional US Patent Application No. 60/278,520 filed March 23, 2001; PCT/US2002/09261 filed March 22, 2002. US National Stage application 10/472,661 filed September 22, 2003. US Patent 7,189,513 issued March 13, 2007. Australian Application No. AU2002258614 filed March 22, 2002. European Patent application EP2002/728570 filed March 22, 2002; European Patent EP14250391. Canadian application CA244197 filed March 22, 2002.
- Strober, W., S. Fichtner-Feigl, M. Terabe, A. Kitani, I. Fuss, J. A. Berzofsky. Treatment Of Primary Tumors and Tumor Metastases with TNF-alpha Antagonists. U.S. Patent Application No. 60/962,668 filed July 31, 2007.
- Berzofsky, J.A., and Q. Zhu. Immunostimulatory Combinations of TLR Ligands and Methods of Use. US Provisional Patent Application Serial No. 60/995,212 filed September 24, 2007.
- NIH CRADA 01361 with Genzyme Corporation (2003-date). Co-principal Investigator
- NIH CRADA 02287 with NanoTherapeutics Corp (2007-date). Principal Investigator.

Jay A. Berzofsky
Speaking and Chairmanship Invitations
1990-2008

1990

- 27 Jan.-3 Feb., 1990 UCLA Symposium on Cellular Immunity and the Immunotherapy of Cancer, Park City, Utah. Invited plenary session speaker.
- 5 Feb., 1990 Walter Reed Army Institute of Research AIDS Conference, Washington, D.C., Invited speaker.
- 2 March, 1990 University of Pennsylvania School of Medicine, Philadelphia, PA, seminar speaker.
- 1-7 April, 1990 UCLA Symposium on HIV and related Retroviruses, Keystone, CO. Invited plenary session speaker.
- 3-7 June, 1990 American Association of Immunologists, FASEB, Meeting, New Orleans, LA. Invited symposium chairperson (Antigen Processing and Presentation) and symposium speaker.
- 20-24 June, 1990 Sixth International Conference on AIDS, San Francisco, CA. Invited plenary session speaker on Vaccines.
- 8-12 July, 1990 Symposium on Antigen Presenting Cells organized by the University of Vienna, Baden bei Wien, Austria. Invited speaker.
- 11-17 Aug., 1990 Laboratory of Tumor Cell Biology Meeting on AIDS and Human Retroviruses, Bethesda, Md. Invited speaker and session chairperson.
- 9-12 Sept., 1990 European Federation of Immunological Societies Meeting, Edinburgh, Scotland, U.K. Invited plenary session speaker.
- 19 Oct., 1990 University of Massachusetts Medical School, Worcester, MA. Invited seminar speaker.
- 29-30 Oct., 1990 NCI Cancer Vaccine Workshop, Bethesda, MD. Invited speaker.
- 15-16 Nov., 1990 New Horizons in Immunology Symposium, organized by *Nature*, Boston, MA. Invited speaker.
- 4 Dec., 1990 National Academy of Sciences Institute of Medicine Meeting on Malaria, Washington, D. C. Invited speaker.

1991

- 12-17 March, 1991 Keystone Symposium on Immunotoxins, Denver, CO. Invited Plenary Speaker.
- 17 April, 1991 Harvard Medical School, Immunology Program, Boston, MA. Invited speaker.
- 3-6 May, 1991 Association of American Physicians, Seattle, WA. HIV session speaker.
- 17-18 May, 1991 Columbia University/Progenics Conference on AIDS, Arden House, NY. Invited speaker.
- 16-21 June, 1991 7th International Conference on AIDS, Florence, Italy. Invited speaker.

1-8 Sept., 1991 Laboratory of Tumor Cell Biology Retrovirus Meeting, Bethesda, MD. Invited speaker and session chairperson.

19-23 Sept., 1991 Cold Spring Harbor Vaccine Conference, Cold Spring Harbor, NY. Invited opening speaker.

15-19 Oct., 1991 Queensland Institute for Medical Research, Bancroft Center Opening Symposium, Brisbane, Queensland, Australia. Invited Plenary Keynote Speaker.

15 Nov., 1991 NIH Technology Transfer Symposium, Bethesda, MD. Invited speaker.

22 Nov., 1991 University of Virginia School of Medicine, Dept. of Microbiology, Charlottesville, VA. Invited speaker.

1992

10 January, 1992 Uniformed Services University of the Health Sciences, Bethesda, MD. Immunology course guest lecturer on Ir genes, and antigen processing and presentation.

4 February, 1992 National Cancer Institute, Experimental Immunology Branch, Bethesda, MD. Invited guest seminar speaker.

12 February, 1992 National Institute of Diabetes, Digestive, and Kidney Diseases, Laboratory of Chemical Biology, Bethesda, MD. Invited seminar speaker.

27 Mar.-4 Apr., 1992 Keystone Symposium on Prevention and Treatment of AIDS, Keystone, CO. Invited plenary speaker.

27 May, 1992 Columbia University College of Physicians and Surgeons, New York, NY. 31st Michael Heidelberger Award and Lecture.

5 June, 1992 Tufts University School of Medicine, Department of Medicine, Boston, MA. Invited Grand Rounds speaker.

13 July, 1992 National Cancer Institute, Laboratory of Tumor Cell Biology, Bethesda, MD. Invited seminar speaker.

9-16 Aug., 1992 National Cancer Institute, LTCB Annual Symposium on Human Retroviruses, Bethesda, MD. Invited speaker and session chairperson.

23-28 Aug., 1992 8th International Congress of Immunology, Budapest, Hungary. Invited chairperson of Workshop on Antigen Processing and Presentation, and speaker.

29-31 Aug., 1992 Symposium on Prediction and Recognition of Antigenic Determinants, Eötvös University, Budapest, Hungary. Invited plenary speaker and chairperson.

21-22 Sept., 1992 NIH Research Festival, Bethesda, MD. Invited session chairperson and speaker.

19-20 Oct., 1992 University of Texas Medical Branch, Galveston, TX. McLaughlin Visiting Professor.

20-23 Oct., 1992 54th Annual MD Anderson Symposium on the Immunobiology of Cancer, Houston, TX. Invited plenary speaker.

1993

21-24 Jan., 1993 New York Academy of Sciences Symposium on the Specific Immune Treatment of Cancer, Washington, DC. Invited plenary speaker.

8-14 Feb., 1993 Keystone Symposium on Antigen Processing and Presentation, Taos, NM, Invited plenary speaker.

17-24 March, 1993 Joint Keystone Symposia on Cellular Immunity and Immunotherapy of Cancer, and on the Molecular Immunology of Virus Infections, Taos, NM. Invited joint plenary session speaker.

19-29 April, 1993 CBER-FDA Workshop on HIV Vaccines, Bethesda, MD. Invited speaker.

28-30 July, 1993 FDA Workshop on Combination Vaccines, Bethesda, MD. Invited speaker.

22-28 Aug., 1993 Laboratory of Tumor Cell Biology Annual Retrovirus Meeting, Bethesda, MD. Invited speaker and chairperson.

20-24 Sept., 1993 Cold Spring Harbor Symposium on Vaccines including the Prevention and Treatment of AIDS, Cold Spring Harbor, NY. Invited opening plenary speaker.

1-4 Nov., 1993 National Cooperative Vaccine Development Meeting on Advances in AIDS Vaccine Development, Division of AIDS, NIAID, Alexandria, VA. Invited speaker.

5-7 Nov., 1993 Project Inform/Immune Restoration Think Tank on HIV Treatment, Baltimore, MD. Invited Discussant.

10 Dec., 1993 Institute of Medicine Symposium "Towards an Understanding of the Correlates of Protective Immunity to HIV Infection," Washington, DC. Invited participant.

1994

23-30 Jan., 1994 Keystone Symposium on HIV, Hilton Head Island, SC. Invited plenary speaker.

13-30 Feb., 1994 Keystone Symposium on Human Tumor Viruses, Taos, NM. Invited plenary speaker.

29 Apr.-2 May, 1994 American Society for Clinical Investigation, Baltimore, MD. Presidential address.

18-19 July, 1994 Conference on Novel HIV Vaccine Strategies, Washington, D.C. Invited plenary speaker.

19-21 Sept., 1994 NIH Research Festival, Bethesda, MD. Invited speaker.

25-30 Sept., 1994 Laboratory of Tumor Cell Biology Annual Retrovirus Meeting, Bethesda, MD. Invited speaker and chairperson.

5-9 Oct., 1994 Cold Spring Harbor Meeting on Molecular Approaches to the Control of Infectious Diseases, Cold Spring Harbor, NY. Invited keynote speaker.

1995

16-23 Jan., 1995 Keystone Symposium on Molecular Aspects of Viral Immunity, Keystone, CO. Invited plenary speaker.

25-27 Jan., 1995 Jennifer Jones Simon Foundation Workshop on Cancer Immunotherapy, Los Angeles, CA. Invited discussant.

29 Jan-2 Feb, 1995 American Society for Microbiology Second National Conference on Human Retroviruses and Related Infections, Washington, DC. Invited speaker.

- 9 Feb., 1995 National Cancer Institute, Pediatric Oncology Branch, NIH, Bethesda, MD. Invited seminar speaker.
- 3-5 Mar., 1995 Second International Conference on Engineered Vaccines for AIDS and Cancer, San Francisco, CA. Invited plenary speaker.
- 19 May, 1995 University of Michigan, Dept. of Medicine, Ann Arbor, MI. Ground Rounds speaker.
- 23-29 July, 1995 9th International Congress of Immunology, San Francisco, CA. Invited plenary symposium chairperson and speaker.
- 27 Aug-2 Sept, 1995 Laboratory of Tumor Cell Biology Annual Retrovirus Meeting, Bethesda, MD. Invited chairperson and speaker.
- 6-9 Sept., 1995 Queensland Institute for Medical Research Golden Jubilee Symposium, Brisbane, Australia. Invited plenary speaker.
- 10-23 Sept., 1995 Australasian Society for Immunology Visiting Speaker, Melbourne, Canberra, and Sydney, Australia, and Dunedin and Auckland, New Zealand.
- 10 Nov., 1995 Emory University, Dept. of Microbiology and Immunology, Atlanta, GA. Invited seminar speaker.
- 30 Nov-3 Dec, 1995 First International Antigen Processing and Presentation Conference: Fundamental Mechanisms and their Application, Los Angeles, CA. Invited speaker.
- 16-19 Dec., 1995 Winter Advanced Course in Immunology and Infectious Disease, Tsuruoka, Japan. Invited faculty member/speaker.
- 1996**
- 26-27 Feb., 1996 IBC Vaccine Technology Conference, Washington, DC. Invited speaker
- 25 Mar., 1996 CHI Symposium on New Cancer Strategies: p53 Diagnostics and Therapy, Washington, DC. Invited speaker.
- 26 Mar., 1996 Institute of Medicine Vaccine Workshop, Washington, DC. Invited speaker.
- 17-20 Apr., 1996 British Society for Immunology Jenner Bicentenary Symposium, Bristol, UK. Invited plenary speaker.
- 7-13 Sept., 1996 Institute of Human Virology Annual Retrovirus Meeting, Baltimore, MD. Invited speaker.
- 1-3 Oct., 1996 NIH Intramural Immunology Retreat, Airlie, VA. Invited workshop chair.
- 25-27 Oct., 1996 University of Rome Cancer Immunotherapy Symposium, Rome, Italy. Invited speaker.
- 23-27 Nov., 1996 Japan Immunology Society Jenner Bicentenary Symposium, Yokohama, Japan. Invited plenary speaker.
- 1997**
- 22 Jan., 1997 AIDS Malignancies Working Group Symposium, Washington, DC. Invited speaker.
- 1-7 Feb., 1997 Keystone Symposium on Cellular Immunology and Immunotherapy of Cancer, Copper Mountain, CO. Invited plenary speaker.

3-4 Mar., 1997 University of Alabama at Birmingham, Dept. of Medicine Trainee Research Symposium, Invited Keynote Speaker.

23-25 Mar., 1997 Symposium on Immunogenicity of Proteins, Genentech, South San Francisco, CA. Invited speaker.

9 Apr., 1997 NCI Grand Rounds Speaker, Bethesda, MD (Construction of Engineered Vaccines for HIV).

13-19 Apr., 1997 Keystone Symposium on Tolerance and Autoimmunity, Keystone, CO. Invited workshop chair.

30 Apr.-2 May, 1997 2nd National Symposium on Basic Aspects of Vaccines, Bethesda, MD. Invited session chairperson and plenary speaker.

15-21 Sept., 1997 Institute of Human Virology Annual Meeting, Baltimore, MD. Invited State-of-Art Lecturer.

1998

14 Jan., 1998 NIDR Invited Lecture, Bethesda, MD.

5-8 March, 1998 UCLA Symposium "Towards an HIV Vaccine: Immunopathogenesis of HIV Infection," Palm Springs, CA. Invited plenary speaker.

13-19 March, 1998 Keystone Symposium on HIV Pathogenesis and Treatment, Park City, Utah. Invited speaker.

27 March, 1998 Georgetown University Lombardi Cancer Center, Washington, D.C. Invited speaker.

3 June, 1998 Wistar Institute, University of Pennsylvania, Philadelphia, PA. Invited speaker.

16 June, 1998 Bio'98 Symposium, New York, NY. Invited symposium speaker.

23-29 Aug., 1998 Institute of Human Virology Annual Meeting, Baltimore, MD. Invited State-of-Art Lecturer

18-22 Oct., 1998 5th International Union of Biochemistry and Molecular Biology Conference on the Biochemistry of Health and Disease, Jerusalem, Israel. Invited Symposium Speaker.

25 Oct., 1998 Weizmann Institute of Science, Rehovot, Israel, Invited seminar speaker.

26 Oct., 1998 University of London Medical School, Guy's Hospital, Invited seminar speaker.

1-6 Nov., 1998 10th International Congress of Immunology, New Delhi, India. Invited Symposium Speaker.

18-20 Nov., 1998 NMHCC Conference on Functional Antigenics, Washington, D.C. Invited speaker.

10-11 Dec., 1998 FDA-NCI Workshop on Tumor Vaccines, Bethesda, MD. Invited speaker.

1999

- 7-13 Jan., 1999 Keystone Symposium on HIV Vaccine Development, Keystone, CO. Invited speaker
- 16 March, 1999 University of Pittsburgh School of Medicine, Invited seminar speaker
- 12-17 April, 1999 Keystone Symposium on DNA Vaccines, Snowbird, Utah. Co-organizer and invited plenary speaker.
- 21-23 April, 1999 5th National Symposium on the Basic Aspects of Vaccines, Bethesda, MD. Invited plenary session chair and speaker.
- 6 May, 1999 Workshop on Alloimmunization as a Strategy for Vaccine Design against HIV/AIDS, Bethesda, MD. Invited speaker.
- 7-9 June, 1999 6th International Symposium on Hepatitis C and Related Viruses, Bethesda, MD. Invited plenary speaker.
- 30 Aug-3 Sept 1999 Institute of Human Virology Annual Meeting, Baltimore, MD. Invited State-of-Art Lecturer
- 8-10 Sept., 1999 International Congress on Cytokines, Bethesda, MD. Invited speaker.
- 13 Dec., 1999 Hôpital Cochin INSERM Unit, Paris, France. Invited seminar speaker.
- 13-15 Dec., 1999 Club Francophone des Cellules Dendritiques Symposium, Paris, France. Invited plenary speaker.

2000

- 21-27 Jan., 2000 Keystone Symposium on Cellular Immunology and Immunotherapy of Cancer, Santa Fe, NM, Invited Workshop Chairperson and speaker.
- 8-12 March, 2000 2nd Sabin Vaccine Foundation Walker's Cay Colloquium on Immunotherapy of Cancer, Invited Speaker
- 6 April, 2000 New York Blood Center, New York, NY. Invited seminar speaker.
- 3-5 May, 2000 6th National Symposium on the Basic Aspects of Vaccines, Bethesda, MD. Invited plenary session chair and speaker.
- 11 May, 2000 NIH Cytokine Symposium, Bethesda, MD. Invited Speaker
- 12-16 July, 2000 Mid-Summer Symposium on Hepatitis C Virus Vaccines, Jamaica. Invited speaker and session organizer/chair
- 10-15 Sept., 2000 Inst. of Human Virology Annual Mtg, Baltimore, MD. Invited State-of-Art Lecturer
- 22 Sept., 2000 NCI Symposium on Bench to Bedside and Back, Basic and Translational Biomedical Research, Bethesda, MD. Organizer and Chair.
- 2 Nov., 2000 NIH Collaborative Meeting on HIV Vaccines, Bethesda, MD. Invited Speaker.
- 7-8 Dec., 2000 Forum for Collaborative HIV Research/ George Washington University Workshop on Immune-Based Therapies and HIV Disease, Washington, DC. Invited discussant.

2001

10 January, 2001	Institute of Human Virology, Baltimore, MD. Invited seminar speaker.
17-18 Jan., 2001	Genetics Institute, Cambridge, MA. Invited seminar speaker.
22-27 Jan., 2001	Keystone Symposium on the Interface between Innate and Adaptive Immunity, Keystone, CO. Invited plenary session speaker.
4-8 Feb., 2001	8 th Conference on Retroviruses and Opportunistic Infections, Chicago, IL. Invited symposium speaker.
7-10 Mar., 2001	3 rd Walker's Cay Colloquium on Cancer Vaccines and Immunotherapy, Sabin Vaccine Institute, Walker's Cay, Bahamas. Invited speaker.
28 Mar.-3 Apr., 2001	Keystone Symposium on AIDS Vaccines in the New Millenium, Keystone, CO. Invited plenary session speaker.
1 May, 2001	Vaccine Research Center, NIH, Bethesda, MD. Invited seminar speaker.
2-4 May, 2001	7 th National Symposium on Basic Aspects of Vaccines, Bethesda, MD. Organizing committee.
4-7 May, 2001	Federation of Clinical Immunology Societies (FOCIS) Meeting, Boston, MA. Invited plenary session speaker.
2 July, 2001	Celera Genomics, Inc., Rockville, MD. Invited seminar speaker.
22-28 July, 2001	11 th International Congress of Immunology, Stockholm, Sweden. Invited workshop chair.
27 Aug. 2001	IDEC Pharmaceuticals, La Jolla, CA. Invited seminar speaker.
9-13 Sept., 2001	International Meeting of the Institute of Human Virology, Baltimore, MD. Invited plenary session speaker.
27-31 Oct., 2001	13 th Cent Gardes Symposium on Retroviruses of Human AIDS and Related Animal Diseases, Annecy, France. Invited speaker.
28 Nov.- 2 Dec., 2001	3 rd Midwinter Symposium on Hepatitis C Virus, Barbados. Invited speaker and chairperson.
18 Dec., 2001.	Pulmonary Branch, National Heart, Lung, & Blood Institute Seminar, Bethesda, MD. Invited speaker.
2002	
16-22 Jan., 2002	Keystone Symposium on T Lymphocyte Activation, Differentiation, and Death, Keystone, CO. Invited plenary speaker.
6-10 March, 2002	Fourth Walker's Cay Colloquium on Cancer Vaccines and Immunotherapy, Walkers Cay, Bahamas. Invited speaker.
5-11 April, 2002	Keystone Symposium on HIV-1 Protection and Control by Vaccination, Keystone, CO. Invited plenary speaker.
10-15 April, 2002	Keystone Symposium on Gene-Based Vaccines, Breckenridge, CO. Co-organizer and invited plenary speaker.
22-24 April, 2002	International Meeting on Cytokines as Natural Adjuvants: Perspectives for Vaccine Development, Rome, Italy. Invited plenary speaker.

1-3 May, 2002	8 th National Symposium on Basic Aspects of Vaccines, Bethesda, MD. Organizing committee
10 May, 2002	International Immunological Readouts Meeting (Workshop), Bethesda, MD. Invited speaker.
26 June, 2002	American Association of Immunologists Introductory Course in Immunology, Tufts University, Medford, MA. Invited lecturer.
27-31 July, 2002	FASEB Summer Research Conference on Therapeutic and Preventive AIDS Vaccines, Tuscon, AZ. Invited plenary speaker.
9-13 Sept., 2002	International Meeting of the Institute of Human Virology, Baltimore, MD. Invited plenary session speaker.
23-25 Oct., 2002	DNA Vaccines 2002, Royal College of Physicians, Edinburgh, Scotland. Invited plenary speaker.
26-29 Oct., 2002	XIII th Cent Gardes Meeting on HIV and AIDS Vaccines, Annecy, France. Invited plenary speaker.
5-8 Nov., 2002	2 nd International Workshop on CD1 Antigen Presentation and NK T Cells, Woods Hole, MA. Invited speaker.
18-23 Nov., 2002	BioSecurity 2002: Vaccines: The Paradigm Quake, Las Vegas, NV. Invited speaker.
25-27 Nov., 2002	Pan American Health Organization Centennial Celebration Conference on Vaccines, Washington, DC. Invited plenary speaker.
2003	
7 Jan., 2003	NIH Academy, Invited speaker.
15-19 Jan., 2003	AACR Special Conference in Cancer Research: The TGF- β superfamily—roles in the pathogenesis of cancer and other diseases, La Jolla, CA. Invited plenary speaker.
23-24 Jan., 2003	AAI/NCI Workshop on Cancer Immunology, Bethesda, MD. Invited participant.
27 Jan., 2003	University of Chicago Committee on Immunology Seminars, Chicago, IL. Invited speaker
17-23 Feb., 2003	Keystone Symposium on Basic Aspects of Tumor Immunology, Keystone, CO. Invited speaker.
5-8 March, 2003	Sabin Vaccine Institute 5 th Walker's Cay Colloquium on Cancer Vaccines and Immunotherapy, Walker's Cay, Bahamas. Invited speaker.
13 March, 2003	Experimental Transplantation Branch, CCR, NCI, Bethesda, MD. Invited seminar speaker.
28 Mar-4 Apr., 2003	Keystone Symposium on HIV Vaccine Development, Banff, Alberta, Canada. Invited speaker.
23-24 April, 2003	Kunkel Society of Rockefeller University Annual Meeting, New York, NY. Invited plenary speaker.

30 Apr.-2 May, 2003	9 th WRAIR National Symposium on Basic Aspects of Vaccines, Bethesda, MD. Organizing committee
15-19 May, 2003	3 rd Annual Meeting of the Federation of Clinical Immunological Societies (FOCIS), Paris, France. Invited speaker.
20 May, 2003	American Society for Microbiology Annual Meeting, Washington, DC. Invited symposium speaker.
1-2 June, 2003	Nobel Forum on Vaccines and Immunotherapy, Stockholm, Sweden. Invited plenary speaker.
29 Sept.-3 Oct., 2003	International Meeting of the Institute of Human Virology, Baltimore, MD. Invited plenary session speaker, special lecture.
14-17 Oct., 2003	MD Anderson 56 th Annual Symposium on Fundamental Cancer Research: Cancer Immunity: Challenges for the Next Decade, Houston, TX. Invited plenary speaker.
1 Dec., 2003	USDA Agricultural Research Service National Immunology Conference, Bethesda, MD. Invited Keynote Speaker.

2004

6-11 Jan., 2004	Keystone Symposium on Rational Design of Vaccines and Immunotherapeutics, Keystone, CO. Invited plenary speaker.
25-30 Mar, 2004	Keystone Symposium on Immune Evasion, Taos, NM. Invited plenary speaker.
17-21 Apr, 2004	American Association of Immunologists Annual Meeting, Washington, DC. Invited Symposium Chairperson and Speaker.
29-30 Apr, 2004	10 th WRAIR National Symposium on Basic Aspects of Vaccines, Bethesda, MD. Invited Symposium Chairperson and Speaker.
13-15 June, 2004	International Workshop on Cancer Vaccines, Siena, Italy. Invited plenary speaker.
15-18 June, 2004	International Colloquium on Innate and Adaptive Immunity after Transcutaneous or Mucosal Vaccination, Veyrier du Lac, France. Invited plenary speaker.
18-24 July, 2004	12 th International Congress of Immunology and 4 th Annual Conference of the Federation of Clinical Immunological Societies, Montreal, Canada. Invited minisymposium speaker.
6 Sept., 2004	Queensland Institute of Medical Research, Brisbane, Australia. Invited seminar speaker.
8-13 Sept, 2004	3 rd International Workshop on NKT Cells and CD1-mediated Antigen Presentation, Heron Island, Australia. Invited plenary speaker.
10-13 Oct, 2004	International Symposium on Tumor Escape and Its Determinants, Salzburg, Austria. Invited plenary speaker.
31 Oct-4 Nov, 2004	International Meeting of the Institute of Human Virology, Baltimore, MD. Invited Symposium Chairperson and Speaker.
17 Nov, 2004	The 2004 Tadeusz J. Wiktor Memorial Lecture, Wistar Institute, University of Pennsylvania, Philadelphia, PA.

2005

- 19-24 March, 2005 Keystone Symposium on Basic Aspects of Tumor Immunology, Keystone, CO. Invited Speaker and workshop chair.
- 29 Aug-2 Sept, 2005 International Meeting of the Institute of Human Virology, Baltimore, MD. Invited Symposium Chairperson and Featured Speaker
- 19-21 Sept, 2005 NIH Immunology Interest Group Retreat, Airlie, VA. Invited session chair and organizer.
- 22-23 Sept, 2005 International NCI Symposium on Translational Immunology Related to Cancer, Bethesda, MD. Organizer, Session Chair, and Plenary Speaker.
- 24 Oct., 2005 Albert Einstein College of Medicine, Bronx, NY. Invited seminar speaker.
- 10-11 Nov, 2005 CHAVI Conference on Mucosal Immunity and Vaccines, Duke University, Durham, NC. Invited plenary speaker.
- 16-19 Nov, 2005 First International Dead Sea Conclave on HIV and Cancer Vaccines, Dead Sea, Jordan Valley Marriott Resort and Conference Center, Jordan. Invited session chair and plenary speaker.
- 13-14 Dec, 2005 Boston University International Conference on Biodefense, Boston, MA. Invited plenary speaker.
- 16 Dec, 2005 Laboratory of Experimental Immunology, Frederick Cancer Research and Development Center, CCR, NCI. Invited seminar speaker.

2006

- 5-7 Feb, 2006 Hasumi Foundation International Symposium on Cancer Vaccines, Bethesda, MD. Invited Plenary Speaker.
- 9 Feb, 2006 NCI Symposium on Inflammation and Colon Cancer, Bethesda, MD. Invited panel discussant.
- 5-9 March, 2006 American Association for Asthma, Allergy, and Immunology Annual Meeting, Miami Beach, FL. Invited Plenary Speaker.
- 26-29 May, 2006 International Symposium on Cancer Vaccines, Naples, Italy. Invited Plenary Speaker.
- 4-8 Oct., 2006 International Conference on NKT Cells and CD1, Siena, Italy. Invited speaker.
- 30 Oct., 2006 Symposium on IL-15 and Immunotherapy, Bethesda, MD. Invited speaker.
- 17-21 Nov, 2006 10th International Meeting of the Institute of Human Virology, Baltimore, MD. Invited plenary speaker and session chair.

2007

- 25-28 Jan, 2007 Symposium on Immune Suppression in Cancer, Moffitt Cancer Research Center, Tampa, FL. Invited plenary speaker.
- 1 Feb, 2007 International Society for Cutaneous Lymphoma, Herschel Zackheim Memorial Lecture and Award.

8-9 Feb, 2007	FDA-NCI Cancer Immunotherapy workshop, Organizer and session Chair
15-19 Feb, 2007	American Association for the Advancement of Sciences (AAAS) Annual Meeting, San Francisco, CA. Chair-elect of Medical Sciences Section.
17-18 March, 2007	Symposium on Two Decades of Predictive Biology, Boston University, Boston, MA. Invited plenary speaker
21-23 March, 2007	Symposium on Viruses, Genes and Cancer, Venice, Italy. Invited plenary speaker.
12-14 April, 2007	International Cancer Vaccine Symposium, Vienna, Austria. Invited plenary speaker.
12-14 April, 2007	Third Vienna Vaccines Conference, Baden, Austria. Invited plenary speaker.
18-22 May, 2007	94 th Annual Meeting of the American Association of Immunologists, Miami Beach, FL. Invited symposium speaker.
12-13 July, 2007	NCI Immunotherapy Workshop, Bethesda, MD. Invited speaker.
23 July, 2007	Viral Immunology Symposium, Johns Hopkins University School of Public Health, Baltimore, MD. Invited plenary speaker.
9-11 Sept. 2007	Nobel Forum on Progress in Vaccines against Cancer, Stockholm, Sweden. Invited plenary speaker.
27 Sept, 2007	University of Pittsburgh, Pittsburgh, PA. Invited seminar speaker.
9-10 Oct., 2007	NCI Center of Excellence in Immunology Symposium on Cancer and Inflammation, Bethesda, MD. Organizing committee and session chair.
28-30 Oct., 2007	ANRS and NIH Symposium on Mucosal Immunity and HIV/AIDS Vaccines, Annecy, France. Invited plenary speaker.
1-2 Nov., 2007	NCI Symposium on HIV and AIDS Research, Bethesda, MD. Organizing committee and speaker and session chair.
4 Dec., 2007	NCI Center for Cancer Research Grand Rounds, Bethesda, MD. Invited speaker.
2008	
15-18 Feb, 2008	American Association for the Advancement of Science Annual Meeting, Boston, MA. Invited symposium chair and speaker.
6 March, 2008	National Heart, Lung, and Blood Institute, Hematology Branch, Bethesda, MD. Invited seminar speaker.
17 March, 2008	Nippon Medical School, Dept. of Immunology, Tokyo, Japan. Invited seminar speaker.
18 March, 2008	RIKEN Research Institute, RIKEN Research Center for Allergy and Immunology, Yokohama, Japan. Invited seminar speaker.
18 March, 2008	St. Marianna University Medical School, Dept of Rheumatology, Kawasaki, Japan. Invited seminar speaker.
19-21 March, 2008	National Institute for Neuroscience, Department of Immunology, Tokyo, Japan. Visiting Professor.

- 2 June, 2008 Institute of Human Virology, University of Maryland, Baltimore, MD. Invited seminar speaker.
- 5 June, 2008 International Symposium on Mucosal Dendritic Cells: From Basic Science to HIV Infection, Paris, France. Invited plenary speaker.
- 13 June, 2008 National Cancer Institute/ Institute of Human Virology Joint Retreat, Bethesda, MD. Invited speaker.
- 17 June, 2008 National Cancer Advisory Board, NCI, Bethesda, MD. Invited speaker.
- 20 June, 2008 Center for Biologics Evaluation and Research, Food and Drug Administration, Bethesda, MD. Invited seminar speaker.